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APR 9 - 1946

Volume VII APRIL, 1946 Number 4

DISEASES OF THE NERVOUS SYSTEM

A PRACTICAL JOURNAL ON PSYCHIATRY AND NEUROLOGY

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PHYSICIANS POSTGRADUATE PRESS
500 NORTH DEARBORN ST., CHICAGO 10, ILLINOIS

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DISEASES of the NERVOUS SYSTEM

(PUBLISHED MONTHLY)

A PRACTICAL JOURNAL ON PSYCHIATRY AND NEUROLOGY

Psychosomatic Medicine and Psychiatry

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Introduction

The currently fashionable term "psychosomatic" has acquired such widespread usage and is to be found in the medical literature of so many fields that it is of value to review the subject at this time. The term is generally taken to mean an approach or point of view which gives due and deliberate weight to both psychological and physiological methodologies. It emphasizes that the total patient needs consideration and that there is no sharp dividing line between his physical and psychological aspects. While the use of this term has a number of advantages, it also has disadvantages. The term should probably be accepted, temporarily at least, but with certain reservations. The essence of the psychosomatic idea is that the psychological and physical approaches to medicine are complementary and both are necessary to a full understanding of clinical problems. After all, physiology and psychology are the same thing in the sense that they study the functions of an organism but from different points of view. Certainly all psychologists and most physiologists agree that physiologic functions cannot be studied accurately in the human being without consideration of the emotions present at the time of the investigation.

From the critical standpoint the term psychosomatic is undesirable. It is dualistic and thereby tends to perpetuate the artificial dichotomy which already handicaps medicine. The term would be unnecessary if it were possible to achieve a thoroughly scientific understanding of the real implications and meanings of the psychoneuroses and if the possibilities of psychogenesis in "organic" conditions could be received with impartiality. It happens, however, that the terms psychoneurosis and psychogenesis have become encumbered with a mass of objectionable connotations. Neither the patient nor the doctor tolerates well the recognition that the complaints have a heavy psychological loading. Hence there is a natural temptation to label any condition in which psychogenesis is prominent as a "psychosomatic disorder." Such usage, if rigorously followed, would leave psychiatry with only the most purely psychogenic disorders, such as the depressive psychoses. On the other hand the psychosomatic conditions with their highly important implication that we must utilize both our organic and our psychologic procedures in diagnosis and treatment would be ignominiously thrown in with the purer organic reactions simply because there was demonstrable pathology.

The term "psychosomatic disease" is also undesirable because, though it suggests a complete diagnosis, it is not included in present day nosology. However, its more enthusiastic advocates suggest that the classification of all diseases be revised to include such considerations. This term will lose its particular value if we permit it to be applied to any considerable portion of those conditions that have been in the past and should continue to be discussed and treated under the general headings of the psychoses and psychoneuroses.

But in spite of theoretical objections to the

adjective "psychosomatic," this term is more popular and more easily accepted than any preceding one. It will continue in use until a better one comes along. Certainly any device or approach which will lead the physician adequately to consider and evaluate the emotional life of his patient will result in better diagnosis and treatment.

Methodologies

The confusion over the role of psychogenesis in medicine results largely from not seeing that the psychological approach and the physical approach are two ways of studying the same organism. The psychological methodology takes account of the consciousness and the behavior of the organism. The other methodology, with which we in medicine are more familiar, makes use of and relies chiefly on physical and laboratory studies. In its basic approach, it takes little account of consciousness.

When we ask a patient how he feels, where he hurts and if he is depressed, we are obtaining data of a psychological nature by recourse to the patient's consciousness and ability to report verbally. There are few disorders that would come to our attention at all quickly if we did not use this psychological approach. It is so common and so natural to us that we frequently do not recognize that we have begun the essential fact-collecting process preparatory to diagnosis and treatment in obtaining these data. Because they are so readily and casually available, it is often irritating to discover their unreliability and their loose connection with the data obtained by laboratory methods.

All goes very well when the patient with a local burn, easily identified by its appearance, refers to it as the source of his pain. It is a different situation, however, when a hypochondriac tells us that he is experiencing great pain, and we can find nothing at all by observation and our laboratory method to support his complaint.

In psychiatry we must commonly work with disorders in which a recourse to the conscious report of a patient is almost the sole method of establishing any reality in his illness. Laboratory techniques are in themselves inadequate. A simple depression, one of man's most common ailments, cannot be identified in an unconscious patient even though we were to examine him with every laboratory facility known today. It is just this type of condition that illustrates most clearly what is usually referred to when we speak of disturbances of the psyche.

At the other extreme, as in the case of the burn, the verbal report of the patient is not necessary although it may be highly useful. A burn or a fracture can be adequately analyzed and therapy begun from the evidence yielded by routine laboratory and other objective procedures. It is these disorders that most clearly illustrate that kind of disturbance which we call organic or somatic. Between these two extremes lie most of the afflictions that may be suffered by patients. Most of our common medical problems represent a situation that must be analyzed and treated by recourse to a conscious report and voluntary cooperation of the patient on the one hand, and by laboratory analysis, x-ray and the use of drugs or surgery on the other.

The concept of psychosomatic medicine has its greatest value when it leads us to recognize more clearly the dual methodology of the psychological report and laboratory analysis, of the voluntary cooperation and physical handling, that are necessary in diagnosis and treatment.

It is important to note that the two methodologies are not *contradictory* but *complementary*.

Clinical Studies

The psychosomatic approach can be taken in the study of any type of disorder. To date, however, most of the studies conducted, have been on the skin, the cardiovascular system and the gastrointestinal tract where the effect of emotion has long been clearly recognized.

As Dunbar[1] and others point out, in such studies it would be desirable to know the following: Is there a characteristic personality type for any given disease? If so, what is the relationship between the personality pattern and the symptoms which characterize the disease? What factors determine the specific expression of the illness? What are the precipitating factors?

The answers to these questions are far from

complete. However, attempts are being made to determine what personality features occur most commonly in each condition studied.

A few examples to illustrate contemporary psychosomatic studies will be given. It is hardly necessary to review the physical and laboratory characteristics of these disorders.

That peptic ulcer is not a purely local disease has been long recognized and is supportable by the following:

1. High strung persons are particularly susceptible to nervous indigestion and to ulcers.

2. Usually the ulcer is preceded by years of gastric dysfunction (hyperacidity, nervous dyspepsia).

3. Ulcers tend to heal and remain quiescent when the patient is mentally at ease.

4. Relapse is prone to occur when the patient again resumes his former activities and responsibilities.

5. Specific emotional disturbances usually aggravate the symptoms.

The psychological aspects of peptic ulcer and gastritis were recently studied in a controlled experiment by Mittelmann and Wolf.[2] A series of patients were psychiatrically studied and subjected to emotional stress. Simultaneously the quantity and acidity of the gastric juice were estimated by samples from a stomach tube and the motility was measured by a stomach balloon and appropriate recording device. It was found that destructive emotions such as anxiety, hostility, frustration, resentment, guilt or aggression produced symptoms of pain, hyperacidity, or bleeding (or aggravated those present). On the other hand soothing emotions such as security and assurance had the opposite effect. The authors felt that the relationships between the emotions described and the functional changes noted in the stomach and duodenum were not necessarily those of cause and effect but were coincident aspects of behavior in reaction to life situations.

They concluded, "In all patients with peptic ulcer it was possible to demonstrate a chronological parallelism between onset, recrudescence and course of the gastrointestinal symptoms and the occurrence of emotional reactions. The situations that prompted these reactions were not necessarily dramatic or in the nature of crises, but because of the existing emotional frame within which they occurred, they had important effects on the patients."

Personality Type: Though each individual is different, ulcer cases as a group have shown certain features which are characteristic: the typical ulcer patient gives the impression of being successful and ambitious. However, he is tense and has an internal insecurity which he covers by hard work.

Psychoanalysts by intensive longitudinal study of individuals give a similar evaluation; that the ulcer patient has a hard exterior and a soft interior. The psychoanalytical explanations of the mechanism make use of the fact that there is a close association, especially in infancy, between emotion and the gastrointestinal tract. Probably no other vital function plays such an important role in the emotional life of the individual. In infancy, especially, feeding is associated with feelings of security and of being loved. In the normal adult this association becomes less evident but continues to play a role.

The psychoanalysts claim, however, that most ulcer patients have strongly retained this association though they are not aware of it. In other words they have a strong unconscious need for affection which is associated with an unconscious desire to be taken care of and to be fed. This constant craving is reflected in disturbed gastric function. It is as if the stomach, in addition to its normal digestive function, is subjected to a constant stimulus from these repressed emotions thus hypermotility and hyperacidity are produced.

Mucous colitis is similarly known to have important psychogenic features.

1. Periods of spastic constipation and periods of diarrhea may be present for years before the typical clinical picture ensues.

2. The symptoms are aggravated by emotional disturbances.

3. The personality of the typical case is sensitive, over-conscientious, dependent and rigid.

4. As in the case of the peptic ulcer, the psychoanalysts find similar personality characteristics by their method of study. They believe that the symptoms of mucous colitis and the personality characteristics are interrelated and are connected with the emotional aspects of bowel function.

Another example may be given: Accidents are an increasingly important medical and public health problem. While accidents can happen to anybody, it is interesting to note that the vast majority of all accidents involve only a relatively small group in the population. This fact is becoming an important guide in personnel work. Dunbar[1] and co-workers recently completed a comparative psychosomatic study of 1600 general hospital admissions of certain common chronic disease categories. These were hypertension, cardiac disorders, diabetes and rheumatic disorders. A group of fracture patients were included for comparison.

Dunbar found that the fracture group could not be used as a control. While this group did not give a homogeneous personality profile, and while the group was nearer to the base line of the general population than the other groups studied, it did, however, have a few distinctive features.

1. Seventy-two per cent of fracture patients had had two or more accidents as compared to less than 1 per cent of cardiovascular patients and only 10 per cent of the latter group had had even one accident.

2. The fracture group had a very low illness rate.

3. The typical fracture patient was free from neurotic traits but he did tend to be overactive and restless. He tended to be self-reliant and to make quick, definite decisions, and he was generally considered a good fellow.

4. Precipitating factors: Dunbar believes that many patients tend to have accidents when strong, aggressive hostility is aroused or pressure from authority becomes too great; for example, when asked to do seemingly unreasonable work on Sunday or when self esteem becomes injured by a long period of unemployment.

5. Dunbar concluded that the personality pattern plays an important role in bringing about the accident itself.

Turning to the question of hypertension, one must admit that our knowledge of the role of psychogenesis in essential hypertension is unsettled. A common view is expressed by Fishberg,[3] "In all probability emotional and mental strains play purely an accessory role in the genesis of essential hypertension serving to precipitate or aggravate the increase in blood pressure in those individuals who have the inherited constitutional predispositions . . . ." Others hold that emotional factors play a more fundamental role.

There have been a number of psychosomatic studies on hypertension which tend to indicate that these patients suffer from an inner psychological tension which is believed to find expression through high blood pressure.

Though psychiatric treatment for hypertension may fail to lower the blood pressure, it often brings considerable improvement in the patient's subjective symptoms. Weiss,[4] an internist, says of psychotherapy, "Although—(it) does not offer a complete solution to the hypertension problem and does not even apply to all patients, it is a practical method of dealing with a set of important factors that may be modified, whereas the constitution of the individual cannot be touched. It is an approach heretofore not sufficiently practiced. We are too much concerned with physical measurements in hypertension—the blood pressure figures, the percentage of renal function, the size of the heart, the electrocardiographic tracing, the amount of renal sclerosis—all of which are essential in the study of the hypertensive person but give incomplete information from the standpoint of the total evaluation of the patient. They should represent the beginning and not the end of study. We are too little concerned with the emotional life, which may hold the key to the satisfactory management of the hypertensive patient."

Psychopathogenesis

As in other branches of medicine, psychiatry has many theories by which it attempts to fill in the gaps of our knowledge. In this field, more than in many others, there are unique problems in semantics. For example, the same general ideas may be expressed by a psychoanalyst and by a neurophysiologist, but in such different language as to be hardly recognizable as similar or complementary. Thus, although the effect of emotion on the body is a matter of common knowledge, we often lose sight of the fact that psychological phenomena are es-

sentially physical phenomena, though of a different order.

In other words there is nothing mystical about psychogenesis. It may disturb any function of the organism and it does this through usual physiologic and physical channels.

Psychogenic phenomena may be expressed as a direct effect on a voluntary function, e.g., a simple hysterical paralysis of an extremity, or they may be expressed indirectly, chiefly through the autonomic nervous system and the endocrine glands. In this way long-standing tension and anxiety can produce chronic patterns of disturbed physiology and thus lead to structural alteration.

In a paper of this length one cannot review even briefly the many theories concerning the human emotions. However, a few points do need mention:

1. The emotional factors which most commonly operate in psychogenesis are more complicated than many physicians realize.

The economic, marital, social or other situational factors which may be looked upon as the chief cause, more often are either precipitating factors or are even secondary symptoms themselves (though a vicious cycle may exist). In other words, while the precipitating or situational factors may be very important, they are often created by long-standing personality deficiencies of the patient himself.

2. Usually of more fundamental importance are the underlying personality patterns such as emotional immaturity and poor personality integration.

a. Heredity and background during childhood are both important in determining the nature of the personality. Many of the troublesome emotions of adult life stem from psychologic residuals of infancy and childhood.

b. Man is not completely aware of, nor able to control directly, many psychological functions (just as in the case of many of his physiological functions). Indeed, some of the most important and potent forces are in the less conscious levels of the mind. Hence they are not readily detectable or remediable. One's inability to see psychic etiology does not necessarily indicate its absence; this is especially true if the examiner is untrained in the psychological methodology.

3. These psychological mechanisms, both conscious and not conscious, are normal and operate in all of us. In other words, psychogenic factors can become pathogenic in anyone but are less apt to do so in an individual with a well balanced personality.

Diagnostic and Therapeutic Considerations

The following comments are offered as a psychological adjunct to the usual diagnostic and therapeutic measures of physical medicine:

1. It is in itself therapeutic for the physician to take the personal history (including the early life story) and to study the personality of the individual patient.

Even realizing this, many physicians do not have sufficient training and aptitude to elicit the desired information. A comment by Weiss[5] is again to the point: "To advise the individual involved in mental conflict not to worry is absurd, especially when, as is so often the case, no concerted effort is made to find out what is disturbing him. Too often the physician is satisfied that there are no problems disturbing the patient after he has inquired, 'Are you worried about anything?' and has received a negative reply. Most of the time the patient really does not know just how much he is disturbed, nor does he relate the factors actually responsible for his discontent. He is much more apt to project his worries into questions about his blood pressure, heart, brain and kidneys. Careful inquiry will bring out that his fears are exaggerated and that the reasons he assigns for them are illogical. There is only one approach that has any merit; that is, to encourage the patient to talk about himself as a person rather than as a medical case."

2. Certain physical examinations, laboratory and special tests are, of course, necessary in any diagnostic study. Our point here is that it is therapeutically disadvantageous to perform an exhaustive search for a physical cause *before* even considering the possibility of psychogenesis. The two methods of investigation, being complementary, can often be carried out simultaneously.

3. The physician's diagnostic thinking will be on safer ground if he will avoid that un-

warranted but common feeling that a patient must be *either* a psychoneurotic *or* an organic case. Instead he should attempt properly to evaluate the various psychogenic factors which may operate in the case, even in the presence of respectable and demonstrable organic symptoms. If he is able to attain this psychosomatic attitude, fewer patients will be forced to turn to quacks.

4. When psychogenic factors are present:

a. If the patient's symptoms are explained to him in a simple, direct manner, using physiological explanations as outlined above, he will more readily accept reassurance and the admonition to "carry on in spite of symptoms." He should not be told that there is "nothing the matter" or that his trouble is "imaginary."

b. The patient should not be led to believe that his symptoms are actually due to some unimportant or conjectural defect, such as a minor deviation, a dead tooth or a mild gastroptosis.

c. The psychologic factor should not be made *necessarily* secondary to the somatic disease present.

d. The patient should be given to understand clearly that various special therapies and medications, although they may be symptomatically helpful and may lessen somatic distress and promote general improvement, yet of themselves cannot bring about adjustment or recovery.[6]

e. If referral to a psychiatrist is necessary, this will be more readily acceptable to the patient if the physician himself accepts the idea and if he gives a preliminary explanation using the psychosomatic approach.

5. What the patient is told is often ineffective whereas the understanding which he arrives at himself or is lead to see, is psychotherapeutically valuable.

Concluding Comment

1. Emotional factors can and do mask serious structural pathology.

2. All symptoms which are not understandable on the basis of structural or physiological deviation are not necessarily psychogenic.

3. When psychological and physical symptoms occur together or in sequence, it does not necessarily follow that one causes the other. They may both be manifestations of the same etiology.

4. Psychosomatic medicine offers no easy road to clinical success. Much study and long practice are required to attain competence in this approach.

5. There is no substitute for common sense and thorough clinical work.

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Concerning Present Inadequacies in the Legal Recognition and Handling of the Mentally Ill

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The purpose of this paper is to present a brief discussion of an existing state of affairs which constitutes both an obstacle to the development and practice of institutional psychiatry and a barrier to the full recognition by the lay and professional public of psychiatry as a medical specialty requiring extensive training and experience. No effort will be made to propose remedies or to offer suggestions to correct the existing procedure. Instead, an endeavor will be made to outline two particular aspects of a significant problem which needs to be recognized and understood generally, namely, that psychiatry should be given equal rating as a medical specialty along with internal medicine, cardiology, dermatology, and other branches of medicine, and should not remain an undefined field in which legal technicalities, lay judgment, and inexperienced medical opinion is allowed to determine the welfare and the future of mentally ill persons.

For the most part this discussion is based upon the general situation existing in the state of Michigan, but it is, nevertheless, either in full or in part, directly pertinent to legal procedures in other states.

The first aspect to be discussed concerns the established legal procedure for the commitment of mentally ill patients. Without being pedantically exhaustive, the usual course of events in Michigan, as in various other states, is for some responsible person to file a petition with the Probate Court, stating their beliefs regarding the sanity of the individual, whereupon the court may issue a temporary order for the detention of the patient in some suitable institution. Before the expiration of that temporary order, two physicians are appointed to examine the patient and upon their findings the court may discharge the patient as not mentally ill or a permanent detention order may be issued. It is not the prerogative of the court to take cognizance of the findings made in the public institution where the patient may be placed for observation. Rather, those findings, however definitive and informative they may be, are legally to be disregarded. Thus, the order for temporary detention and study often constitutes nothing more than a legal but totally meaningless gesture.

The qualifications of the examining physicians appointed by the court to determine the future of a possibly mentally ill patient are essentially that these examining physicians shall be properly licensed, not connected with the institution to which the patient may be committed, and that they shall have had 3 to 5 years experience in the practice of medicine. As a result of these legally established qualifications, the author has seen commitment papers signed by pediatricians, dermatologists, pathologists, obstetricians, cardiologists, general practitioners and even some psychiatrists. One can readily recognize the folly of a common practice of asking a psychiatrist to be the deciding consultant in an obscure cardiac case, but unfortunately, as yet the reverse is not readily appreciated.

The law properly provides that a person may be committed as mentally ill only on the basis of certain established facts. Lack of training and inexperience in psychiatry has resulted in innumerable instances of persons, actually psychotic and in need of institutional care, being committed illegally because the committing physicians' reports were not properly written, the necessary facts were not correctly established, and the court, in the rush of work and in the simple acceptance of mere opinion ordered such commitment. For example, the committing physicians' statements on one patient read, "This patient is insane, with catatonic dementia praecox, and should be sent to a mental hospital and treated for this condition."

*Wayne County General Hospital and Infirmary.

Such a statement is merely a personal opinion, is not substantiated by factual statements as required by law and hence the commitment based upon it was illegal. Furthermore, in this particular instance, although the patient was acutely psychotic and in need of immediate psychiatric care, the correct diagnosis was general paresis. Hence that patient could not possibly be legally committed as suffering from catatonic dementia praecox, and the commitment was an absolute denial of his legal rights and privileges.

Nor is this an isolated instance. From time to time, patients actually psychotic at the time of commitment and still psychotic are discharged from the mental hospital because of illegal commitment, to their own detriment and to that of society as a whole, to say nothing of the debasement of psychiatry as a medical specialty in the eyes of the public and the discredit of the particular institution detaining the patient. The medical and psychiatric rights, privileges, and needs of the mentally ill patient should not be subordinated and sacrificed to questions of legal technicalities. In the case cited of the patient illegally committed as suffering from catatonic dementia praecox when the actual condition was one of general paresis, the court could properly have discharged the patient from the hospital to await commitment on legitimate grounds, all of which would have forced an unnecessary and even destructive delay in the proper treatment of that patient. And such discharges do occur, to the disadvantage of the patient and all concerned.

While it is true that the superintendent of a mental hospital has the right to accept or to refuse admission to a mentally ill patient and can rightly and arbitrarily refuse to accept patients improperly committed, the needs of the individual and of society as a whole cannot be satisfied by arbitrary legal considerations. Nor can the mental hospital serve the community conscientiously and adequately by disregarding the needs of an individual because of an error by someone not directly interested in proper psychiatric treatment of an individual.

The socially conscious superintendent must necessarily place the welfare of the individual and of society above debatable legal questions. He cannot arbitrarily discharge a patient committed to the hospital and accepted in good faith because of a subsequent discovery that legal technicalities actually render the commitment illegal or questionable. The patient's rights and needs as a sick person, and the importance of early and adequate psychiatric treatment cannot and should not be made to wait upon a final judicial determination of what constitutes proper legal procedure. Nevertheless, as has been mentioned, the court is at full liberty, in case of an error in commitment, to discharge a patient seriously in need of psychiatric treatment, and frequently does so to the disadvantage of the patient, the discredit of the institution, the detriment of psychiatry, and without profit in the correction of the defects of the legal procedure.

The second aspect of the problem concerns the failure of the untrained, the inexperienced physician to recognize psychiatric problems and his consequent inability to appreciate their significance. Too frequently patients who are definitely and unmistakably psychotic but whose symptomatology is of such character as to require specialized training and experience to be recognized are denied the benefits of hospitalization and treatment in the early stages of their mental illness.

As mentioned before, it is of little real medical significance who recommends commitment for the mentally ill patients, but it is of serious and destructive significance to the mentally ill patient and to his relatives and to society as a whole to have an early, obscure, or difficult to recognize mental illness completely unrecognized and disregarded. In psychiatry and especially in relation to psychoses, the entire future and welfare of the patient and often that of his family is at stake, and merely an arbitrary number of years in an unrelated field of medicine does not qualify any physician to sit in judgment upon the proper psychiatric care of that patient. Nevertheless, under existing legalities, the untrained, the unqualified, and the inexperienced sit in judgment to determine a psychiatric patient's entire future. And the court, in accord with established legal custom, is, in essence, forced to disregard entirely the findings and the advice of those physicians qualified by training and experience, to whose care the patient was

temporarily committed for observation and study, presumably for the guidance of the court but actually merely to fulfill the letter of the law and not really to serve adequately human needs.

In those cases where the patient expresses a wealth of hallucinatory and delusional ideation and shows bizarre behavior easily recognizable as psychotic, no specialized training is necessary to permit the ready recognition of an obvious psychosis. However, all psychotic patients are not easily recognized as mentally ill, even when they have a wealth of delusional and hallucinatory ideas. They may be so secretive that they may be unwilling to disclose to a stranger their distorted ideas, or they may have sufficient insight to recognize the possible inferences that might be drawn by the court physician if they became communicative. Such patients can easily and often do give sufficiently normal replies to the customary questions asked of them to convince the court examiner of their mental soundness. This is not an infrequent occurrence.

Furthermore, a psychiatric problem is not always to be recognized in a few minutes or even a few days, and no court physician has the time to make a long continued observation and study of a patient. Indeed, patients are often placed by the court in the mental hospital on a thirty-day observation order. While this is a legal recognition of the need and importance of time in studying a psychiatric patient by competent psychiatrists, the discharge of that patient may depend wholly upon a few minutes observation by psychiatrically untrained physicians, who may be totally at variance with experienced psychiatrists in their findings.

Then too, the same sort of diagnostic problems that exist in other fields of medicine obtain in the field of psychiatry. The correct differentiation between a simple maladjustment, a behavior problem, a neurotic manifestation, and an early sign of a psychosis requires diagnostic skill based upon highly specialized training and experience. The more difficult the task, the earlier the signs of mental illness, the greater is the need of the patient and all those concerned for competent psychiatric help. Failure of the recognition of mental cases and refusal and consequent postponement of treatment serve only to increase the severity of mental illness, to render treatment less hopeful, and to militate against the patient's future welfare.

To illustrate some of the problems that arise from the present procedure of relying upon psychiatrically untrained physicians for presumably expert opinion to determine the future of mentally ill patients, the following case histories will be cited briefly. They have been selected from a large number of comparable instances because they disclose the difficulties forced upon the untrained physician or because they exemplify the tragic possibilities of an error in judgment. The case histories have been disguised to conceal identities, but there has been no significant alteration in the psychiatric symptomatology, and while most of them represent Michigan cases, some are from other states.

Patient No. 1 demonstrates the tragedy that may result from lack of psychiatric training. This twelve-year-old child was first seen in psychiatric consultation in a general hospital because of continuous sobbing, fear reactions, and almost delusional statements about being "bad". The psychiatrist recommended immediate commitment and prompt treatment for early schizophrenia.

The court-appointed physicians found only evidence of simple maladjustment in an unhappy home situation and commitment was not recommended. Approximately 18 months later the patient was admitted to a mental hospital for temporary observation, this time with a history of progressively worse adjustment, culminating in homicidal attacks upon members of the family.

Adjustment to the psychiatric ward was excellent and when seen by the court physicians, both concluded the patient to be mentally well and both physicians criticized the hospital for detaining so young a patient. Before one of the physicians had filed his report, however, he visited the hospital to interview another temporary observation patient. He again checked on Patient No. 1 and discovered a state of catatonic stupor which led him to revise his report. As a result of the disagreement of the court physicians at the court hearing, the case was postponed and another temporary observation period ordered. The third physician appointed discovered the patient in a state of catatonic excitement, and commitment was ordered. Thus approximately two years after the patient had been recognized by a trained psychiatrist as suffering from early schizophrenia and in need of prompt treatment, therapy first became available. One can only speculate as to the traumatic effect upon the

patient of the long series of maladjustments finally leading to commitment and upon the role those experiences played in the patient's slow and unsatisfactory convalescence. It is reasonable to believe that had treatment been instituted when first recommended, the further progress of the patient's mental disorder to a homicidal state could have been prevented. Certainly, this patient's rights as a mentally ill patient were violated, even if legally so.

Patient No. 2. This patient illustrates clearly the need for psychiatric training to permit recognition of mental disorders. A young man was brought to the hospital on an emergency order by the police who declared he had delusions about electricity. Four trained psychiatrists interviewed him extensively, found no delusions about electricity or other psychopathological ideational trends. However, each psychiatrist independently reached the clinical conclusion that the patient was suffering from early schizophrenia because of general inadequacies of affective responses. Finally two of the psychiatrists, determined to verify their clinical impression, reinterviewed him exhaustively without critical results until resort was deliberately made to a schizophrenic mispronouncement of the word "electricity" as "electric city."

The patient's reply was most illuminating. "I've been wondering when you fellows would get around to asking me about electric city instead of electricity. I thought you weren't interested, so I just told you what I knew about electricity until you showed some interest." There followed a wealth of delusions centering about "Electric City," which enabled the patient to set the stage for the court physicians by demanding to know if they were just interested in electricity, or if they really wanted to know about "electric city."

In the ordinary course of events this patient would have been discharged until such time as he would have volunteered his secret ideational content. However, specialized psychiatric training permitted an appreciation of those intangible affective reactions and a recognition of the frequent need to meet a schizophrenic patient on his own terms and to use, if necessary, his own peculiar schizoid language.

Patient No. 3 represents a serious social tragedy. A 45-year-old man became assaultive when ordered to "move on" by a policeman. He was arrested, suffered an epileptic convulsion, and was judged by two competent psychiatrists to be suffering from a psychosis with epilepsy and to have serious homicidal trends. He was transferred to a mental hospital for observation because of the recommendations of the psychiatrists. When seen by the court physicians, he made a good impression on them, and they observed no evidence of a psychosis nor of homicidal trends. Six days after his discharge as not psychotic by the court he suffered another convulsion, seemed to make good recovery from that seizure, but a few hours later killed a family of five with an axe.

To ask the psychiatrically untrained physician to offer an expert opinion on such a problem is criminally wrong. Only extensive experience and specialized training can qualify the medical man to deal adequately with such a problem, and even the well-experienced psychiatrist can easily reach the wrong conclusion in such a case as this. However, in this instance, two psychiatrists did reach the right conclusion but their opinion was over-ruled by inexperience at a tremendous social cost.

Patient No. 4 represents an instance where the patient's own needs were recognized only after a roundabout procedure. After having been in four different mental hospitals, the patient was finally ordered released by the Probate Court, a sanity hearing was ordered, and restoration of sanity was the result. Shortly thereafter the patient's unusual and bizarre behavior resulted in arrest and a temporary order for mental observation. The first three court physicians found the patient mentally well but at the insistence of the patient's family physician and the family attorney, the temporary order for observation was continued until the court had appointed two psychiatrists who promptly made a diagnosis of schizophrenia, paranoid type, and commitment was then finally ordered.

This patient has been used repeatedly for teaching purposes because of the perfection with which the role of a mentally normal person is played. Invariably the medical students are convinced that there has been a miscarriage of justice until the patient selects from the group some one who appears sufficiently trustworthy for the patient to relate confidentially a wealth of bizarre delusions and hallucinations otherwise inaccessible.

While the patient's general behavior as a free member of society would have forced eventually a recognition of the mental disorder, 4 different hospitalizations, a restoration of sanity, and further temporary observation were futile, ineffectual procedures that actually delayed any effective care of the patient until the intervention of the family physician and the family attorney secured competent psychiatric opinion.

Patient No. 5 is an instance of individual tragedy. She was admitted on a temporary order as suffering from a possible alcoholic psychosis. The hospital psychiatrists made a diagnosis of chronic alcoholism with psychosis. Within ten days the patient had made an excellent superficial recovery, and upon the recommendations of the court physicians she was ordered discharged, despite the insistence of the ward physician that commitment and treatment were warranted. Two months later, all her resources exhausted, she was picked up by the police while intoxicated and was returned to the hospital

acutely psychotic and seriously damaged organically by her prolonged debauch.

While the future of any alcoholic is uncertain, this patient's life history indicated a reasonably good prognosis up to the moment of her discharge from the hospital by the Probate Court. Now, more than a year later, she is progressively deteriorating.

Patients Nos. 6, 7, 8 and 9 are all instances of tragedy to the family as a result of existing legal procedures. All were women, admitted for temporary observation upon the petition of the husbands and all were found by the hospital psychiatrists to be acutely psychotic with alternating periods of excited behavior and seemingly normal lucid intervals. In each instance, the court physicians found the patients not psychotic, their discharge from the hospital automatically followed and the subsequent development in each case was a disruption of the home and the scattering of the children in three of the cases among relatives, since the husband could not take care of his wife and the children also. In the fourth instance there were no children, and the patient left her husband to live with other relatives, thereby disrupting another home because of her vagaries.

In each of these cases, while the psychoses were unmistakable to the trained psychiatrist, there was adequate opportunity for an error in judgment by someone lacking specialized training. The future for each of these patients is, in all probability, an aggravation of their symptomatology and eventual commitment to a mental hospital at a later date with treatment much less hopeful.

Patient No. 10 represents another type requiring special training to recognize. Over a period of a year she had been admitted to various private hospitals but each time she had herself removed by relatives before a diagnostic study could be made. She finally sought an order from the Probate Court for temporary observation in a mental hospital. After an extensive study, the hospital psychiatrists made a diagnosis of schizophrenia, catatonic type.

This patient had a college background, had studied psychology and psychiatric textbooks, and was able to discuss her hallucinations, her feelings of depersonalization and unreality and her periods of muteness and physical rigidity in a competent, objective fashion with a remarkable degree of purely intellectual insight.

When she was examined by the court physicians, the patient, as she carefully explained later, "took a perverse delight in giving them all the normal answers and convincing them that I am not in the least psychotic." As a result, both physicians believed her to be mentally well.

When she was questioned about her need for treatment and the adverse effect of the court physician's opinion upon this, the patient readily agreed that she needed treatment, but declared cryptically that the opinion of the court physicians was of no concern to her because she could not be removed from the hospital against her will.

What she meant by this became apparent the day before her hearing in court, at which time she developed a severe stupor and remained in that stupor for a week. Thereby she forced a postponement of the hearing, re-examination by duly appointed physicians, and subsequent commitment.

After adequate treatment she was paroled from the hospital and continued in good remission, earning her own living, until contact with her was lost.

In this case, only the patient can be given the credit for effecting a recognition of her needs and rights as a mentally ill patient. Her educational background, her understanding of existing legal procedures, her awareness of the tendency of the committing court to disregard the findings of the institution in which a patient is placed for mental observation and study, and her own pathological need to dominate the total situation, served fortunately to rectify a serious unintentional error of judgment by well-intentioned but not adequately qualified medical men.

Case 11 is an instance in which psychiatry, medicine, and the court all came to serious grief because of the existing legal procedures. It is merely an example of numerous other similar cases and reflects the tremendous need for adequate legal provision for the recognition of mental disease by properly trained and experienced psychiatrists.

This patient, confined to a mental hospital because of mental illness characterized by paranoid trends, was given a hearing in court to determine if hospitalization should be continued. Despite the availability of the hospital records, the presence of the ward psychiatrist at the court hearing, and the actual verbalized protests of the ward psychiatrist, the court took cognizance, in perfectly legal fashion, only of the opinions of two physicians appointed by the court. In accord with their recommendations, the court released the patient, who within a month's time killed two members of his family and committed suicide, all in full accord with the actual predictions made by the ward psychiatrist, and in accord with the information available in the hospital records.

Nor is this the only instance in which untrained, inexperienced, and unqualified medical men are called upon, under existing legal procedures, to assume responsibilities not rightly theirs. Not always are the results so tragic and so apparent, but in many instances the fate of an individual and even of his family has been tragically resolved on

the basis of untrained medical advice when there was available better qualified advice and understanding. In the practice of medicine it is the obligation of every practitioner, if he cannot do good, at least to avoid doing harm. Especially does that obligation rest upon those whom an outmoded legal procedure calls upon to furnish skills not possessed and which are available and acceptable and which lack only the general recognition that must come first from the medical man himself before it can become an established legal custom.

While only 11 cases have been cited, they are but a selected few from a long list of those available to the author. Furthermore, those presented or available for presentation are not unique, since mental hospitals throughout the country could cite extensively similar material. One needs only to read social service histories on out-of-state patients to realize how frequently psychiatry as a medical specialty requiring definite training, skill and experience has been unrecognized, overlooked, and even disregarded by the courts and by the lay and professional public.

In brief, there is need for the lay and professional public to acknowledge that the welfare and the future of mentally ill patients need more legal recognition and protection than is possible under existing legal procedures.

Convulsive Shock Therapy in an Army General Hospital*

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There are many reasons for the selection of electroshock as the method of choice in the Hammond General Hospital; i.e., simplicity of treatment, minimum of nursing care at a time when nurses are few, post-shock reactions are uncommon in sharp contrast to insulin therapy, availability of the instrument, administrative difficulties in obtaining metrazol powder for the preparation of solutions, various economic factors, and most important of all the method produced the desired results. Although metrazol, orthodox insulin-coma, and subcoma insulin therapy have all been utilized in suitable cases, we have found that in the vast majority of cases the simple method of electroshock therapy offers many advantages over the other methods in the treatment of the average case. We, of course, encountered instances in which electroshock therapy did not prove to be curative and where remission resulted only after employment of one of the other methods. We also observed the reverse.

Generally speaking it must be stated that no method of treatment can be expected to result in recovery unless it is custom-tailored to suit the needs of the individual patient. One is no more justified in setting up a standard operating procedure for the routine administration of the same type of psychiatric treatment to all patients admitted to a specific ward, than in the administration of the same cathartic in the same dosage to every patient admitted to a certain ward. It is elementary that in so delicate a matter as psychotherapy one could never get by for long with this sort of policy even though in organic medicine it is conceivable that for a time at least, a standard operating procedure might prove feasible.

In this hospital patients, after being examined and their case records worked up, are referred to the Chief of the NP Service by the ward physician with a recommendation for treatment. This recommendation may be approved, enlarged upon, or disapproved and a different form of treatment suggested. There is no special shock therapy ward. Each ward houses patients receiving various forms of treatment so that on the same ward there may be patients whose treatment is maintained entirely on the psychologic plane while other patients are receiving electroshock, sub-coma insulin, insulin-coma, or metrazol treatment. In some cases a combination of treatments is prescribed in such a way that

*Read before the Ninth Service Command Neuropsychiatric Conference, Bushnell General Hospital, Brigham, Utah, October 1-2, 1945.

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they either complement or supplement each other. There is no "treatment section." All physicians permanently assigned to this Service are trained in the application of the respective forms of treatment and effort is made to have the treatment applied by the physician in charge of the patient or of the ward. At times the physicians are rotated so that each one takes charge of shock therapy techniques for a period of a week.

PROCEDURE

Prior to the administration of shock therapy the patient is sent to the x-ray department for a lateral film of the thoracic spine and an electrocardiogram is made. In suitable instances advantage is taken of the various consultants available in a general hospital. By the time these examinations are completed the case has been reviewed by the Chief of Service and where indicated, the plan of treatment is approved. Treatments are ordinarily given three times per week with a rest interval of 24 hours between treatments and a further interval of 48 hours between each group of three treatments. Resistive patients receive scopolamine, 0.0006 gm., subcutaneously one hour before shock treatment. If sedation is required the night before treatment, scopolamine is the only drug permitted. It has been our experience that after the third or fourth treatment patients are quite cooperative and do not require drugs.

The treatment room is furnished with a wooden table on which there is a regulation hospital mattress contained in a rubberized mattress-cover. Electrode paste is applied to the posterior temporal region on each side, the patient's mouth is examined for chewing gum or other foreign bodies and then he is asked to lie down. A double blanket roll is fixed to the table in such a manner that a line drawn through the superior aspect of the patient's axilla coincides with a line drawn along the superior aspect of the blanket roll. An attendant standing on either side of the patient, exerts downward pressure on the patient's shoulders by inserting the heel of the hand into the natural depression found in the lateral subclavicular region. A third attendant crosses the patient's arms on his chest so that dislocation of the shoulders may be avoided by maintaining the arms in adduction. No other form of restraint is employed. Hyperextension over the blanket roll in the thoracic region is maintained by preventing the forward jerking of the upper fourth of the body in the manner described above, while the weight of the body from the lower thoracic region down supplies the counter-force necessary to maintain the extension. If the patient is cooperative he is asked to bite on a mouth gag of two paper towels made into a roll and covered with a single layer of reclaimed gauze. This is bent into a horseshoe shape and inserted in the mouth so that the patient's tongue lies underneath it and the incisor teeth are separated.

The shock electrode consisting of a rubber belt attached to rectangular electrodes was found unsatisfactory and we substituted a caliper type of electrode headset. There is difficulty in strapping the manufacturer's electrodes in place, first because of the slippery paste and secondly because of the patient's preconceived notion of the dangers of treatment. He becomes excessively tense and fearful in the course of the manipulation necessary to crimp the electrodes in place. With the caliper type of headset, the patient is unaware of what is about to happen as the electrodes are applied from below the level of the table and superiorly and he does not feel a constricting band around his forehead.

To avoid subluxation of the jaw the physician's hand is pressed on the patient's chin in such a way as to provide a counter-force to the yawn which is ordinarily experienced in electroshock therapy. The use of the caliper type headset necessitates some modification of our electroshock apparatus, since one hand holds the headset while the other holds the patient's chin. We have attached to our apparatus a set of foot controls which correspond in position to the "test" and "treat" buttons in the original apparatus. In applying treatment, the operator steps on the "test" button and turns the control knob with his right hand while applying the electrodes with his left. Having attained the proper intensity of current the operator slips the right hand from the control knob to the patient's chin, holding the electrodes in place with the left hand and shifts his foot from the "test" to the "treat" button. This pro-

duces exactly the same effect as would be performed by using the original apparatus and the physician's hands are free to control the movements of the jaw.

After much experimentation we determined that the initial dose for the average patient is a current of 500 milliamperes administered for 0.5 second. Our objective is to produce a grand mal seizure in every case and to avoid petit mal or psychomotor seizures even if in a specific instance this initial dosage is a little higher than might be determined by actual experimentation on the individual patient. It is more important to produce a complete convulsive reaction than to take the chance of a minor reaction by administering a smaller dose. Our experience since the early days of shock therapy has taught us that patients who are permitted to leave the treatment room after having undergone only a petit mal or psychomotor seizure are confused, apprehensive, and apparently set back in their progress.

Occasionally this dosage is ineffective and the patient experiences only a minor reaction. It is our opinion that in such cases a complete convulsive seizure should be immediately induced. Experience, however, has demonstrated that the delay occasioned by the patient's refractoriness to a second electroshock is sufficient to produce psychologic ill-effects and we therefore do not attempt to re-apply the current. Instead we immediately inject intravenously 5 cc. of a 10 per cent solution of metrazol in 2.5 per cent sodium citrate. This ordinarily produces a grand mal seizure. Due to the confusion and amnesia induced by the previous electroshock these patients do not undergo the apprehensiveness commonly seen in the latent period between injection of metrazol and convulsion.

Following the convulsion the patient is taken to his own ward and permitted to recover in his own bed under supervision of an attendant. As soon as he reacts he is asked to take a shower, is given a change of clothes, and is served a breakfast tray. After he has eaten he joins the other patients in the occupational therapy class. Patients are repeatedly examined and seen in individual psychotherapeutic sessions by their own ward officers and by the Chief of Service.

COMPLICATIONS

In a series of 3,000 convulsive shock treatments administered to 247 patients in this hospital in the past 29 months there have been four instances of compression fracture of thoracic vertebrae. None required treatment in the opinion of the orthopedic consultant.

There have been a few cases of apnoea but all these yielded to the Sylvester method of artificial respiration and in no instance was it necessary to continue this for more than two or three minutes. In patients who are persistently apnoeic, we either substitute metrazol therapy entirely or else inject 2 or 3 cc. metrazol intravenously or 5 cc. intramuscularly prior to the application of the electric current.

In one case of post-partum psychosis following a Caesarian section, curare was used to soften the convulsion and avoid the danger of evisceration. This proved very satisfactory. We have used curare in a number of instances of maniacal behavior associated with various surgical conditions, to the complete satisfaction of both the psychiatrist and the surgeon.

Regulations prescribe that no more than 12 shock treatments be administered in any one course. In many cases 12 treatments are sufficient. In others more treatments are required. In such instances we ordinarily terminate treatment after the 12th reaction and begin a new course of 12 treatments after a few days interval when such action is indicated. No attempt is made to apply the treatment "by the numbers" and as many treatments are administered as are necessary to produce remission. We have had a few patients who required three courses of 12 treatments, separated by short intervals, to achieve remission.

Ordinarily we are quite content to administer three treatments per week but in those cases associated with persistent acute maniacal excitement referred to by some writers as Bell's mania, we have used a different method. We consider these cases an emergency severe enough to warrant listing the patient on the seriously ill list. When such patients are admitted the senior officer is notified, regardless of the hour of the day or night and immediate steps are taken to terminate the excitement. We have had cases

in which it was necessary to administer the first three treatments at intervals of eight hours followed by two treatments at intervals of twelve hours, before entering into the three treatment per week schedule. Experience with epileptics who have had repeated attacks has shown that the human economy can survive convulsive seizures at relatively short intervals without residual damage. In cases of mania, procrastination leads to exhaustion and to the type of death observed in acutely excited patients in observation wards prior to the era of shock therapy. Between treatments, efforts are made to counteract the dehydration and protein-depletion of the patient by the administration of blood plasma, protein hydrolysates such as Amigen and by hourly nasal tube feedings of high protein liquids. These feedings should total 7,000 calories including 200 grams of protein in a 24 hour period. This is a fair caloric intake for an individual in a continuous state of excitement and therefore expending more energy in a stated period of time than a stevedore. Examination of the urine of these excited patients often reveals the presence of acetone, indicating that starvation ketosis is occurring. At least 5,000 cc. of fluid must be ingested during every 24 hours. If the patient is so disturbed that he does not cooperate with these nutritive measures we administer intravenous hypnotics, since the reversal of the state of protein depletion and dehydration is absolutely essential to his remaining alive.

These patients occasionally are admitted in a state of fever, with temperature at 103 or 104° F. Contrary to earlier writings, including those of the present author, it is our present opinion that fever is ordinarily not a contraindication to shock therapy and the regimen herein prescribed. In fact, the fever due to excitement, dehydration, and protein-depletion is a definite indication for early termination of excitement. The effectiveness of our method of treatment of acutely excited patients is established by the fact that there have been only two excitement deaths on this Service since its inception and both of these deaths occurred in patients whose psychosis was secondary to far advanced organic brain changes as revealed by post-mortem examination and in these cases shock therapy was not employed.

INDICATIONS AND RESULTS

The excitement states associated with the usual psychoses, prison psychoses, whether of the depressive, confused, agitated, or Ganser type, post-partum psychoses, and reactive depressions were all influenced favorably by convulsive shock therapy in this hospital. Our experience has demonstrated that a depressive cast in these disorders is a good prognostic indicator. Good results have been obtained in both depressive and manic phases of the cyclothymic reaction types. In schizophrenic reactions we achieved better results in the catatonic variety with electroshock therapy while in the paranoid variety metrazol therapy appears to have been more effective. We did not attempt to treat schizophrenic reactions of the simple type. A few real hebrephrenic reactions were seen here and in these cases we found that electroshock therapy influences the cases of shorter duration while metrazol appears to exert a more beneficial effect on cases of longer duration. A few patients who were not helped by convulsive therapy, derived great benefit from sub-coma insulin or insulin-coma therapy. We have not been able to investigate the effects of insulin therapy on all those who failed to improve after convulsive therapy because of inability to obtain adequate nursing personnel. The prison psychoses yield very rapidly and gratifyingly to convulsive shock therapy.

In general, it may be stated that patients whose conflict is sufficiently active to produce violent external manifestations yield more readily to this treatment than those who have accepted their conflict by the process of regression and who are no longer struggling against the regressive process. It is our opinion that remissions must be attributed to the whole treatment plan of psychotherapeutic sessions and the general therapeutic ward atmosphere as well as the contact-restoring influences of the shock therapy. Aside from the therapeutic results obtained by these methods, we feel that the use of bare rooms or rooms with only mattresses on the floor, of excessive mechanical restraint and of sedative packs and continuous-flow tubs are antiquated by the present forms of treatment.

Myasthenia Gravis

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Myasthenia gravis is an illness of gradual development with phases of improvement and relapse. Its most apparent characteristic is rapid fatigue followed by muscular weakness. It is predominant in the region of the cranial nerves and seems to be a functional disorder of the neuro-muscular junction.

Myasthenia usually commences in the second decade of life in females and in the third in males. Wilson, at the National Hospital in London, found out that it was most frequent among persons between 40 and 50 years of age. Some cases have been discovered in children (10 years — Gerstle, Roussy and Rossi) and in old people. It has a preference for the female sex. Its affection is not hereditary nor familial although Marinesco and Middelesco (1908—Semaine Médicale) found myasthenia in 2 sisters; H. B. Rothbart in 4 brothers; F. L. Strikroot, R. L. Schaeffer and H. L. Bergo in mother and daughter; H. A. Riley and M. Frocht in two sisters. Several authors assert its constitutional character.

Occupation, social position, race and geographical location have no influence on this illness. Its cause has been attributed to various infections such as grippe, typhoid fever and lethargic encephalitis. Some authors state that it occurs in connection with endogenous intoxications (renal, hepatic, digestive) and exogenous intoxications (poison gas, barium salts, etc.).

Great importance has been given to the alteration of the internal secretion glands, especially of the thymus and, in fact, some statistics record a hypertrophy in more than 50 per cent of cases. Moreover, such additional elements as ecstacy, prolonged emotion (mostly in the form of anxiety), psychical weariness, chills, intense and prolonged coldness, electric shocks, avitaminosis, etc., are cited.

There are several theories advanced to explain the myasthenia: 1) nervous, 2) muscular, 3) glandular, 4) mixed and 5) chemical theories.

The "nervous theory" states that the discrete modifications of the nervous element play an important role. However, the lesions are not always identical.

The "muscular theory" is advanced by two different groups of authors. One group claims a primitive alteration of the muscles, and the other attributes the muscular alteration to a toxic or endocrinotropic factor. Both groups take as their basis the frequent structural modifications of the muscular fiber.

Under the "glandular theory," myasthenia is attributed to isolated or associated disorders of the parathyroids, the thyroids, hypophysis, the suprarenal or the thymus. Marinesco explains the suprarenal vegetative origin in this way: normally, the contraction of a muscle is connected with a vessel-constriction but in myasthenia cases there is a vessel-dilatation, indicating physical-chemical modifications of the muscles. Although interesting, Marinesco's theory is not satisfactory, because several facts remain unexplained, notably the enlargement of the thymus in the majority of cases.

The "physical-chemical theory" stems from a statement by Oppenheim to the effect that myasthenic paralysis is an affection of the myo-neural junction.

As long ago as 1850 Pelouze and Bernard discovered that injections of curare block influx to the muscle. This blocking takes place at the neuro-muscular junction. Waller obtained the same effect by prolonged excitation of the nerve. The transmission of the nervous excitation to the muscle has two different explanations: an electrical transmission and a chemical one. In the "electric" transmission the nervous current causes an electric excitation which passes through the nerve and, after suffering a slight delay at the mio-neural junction, stimulates the muscular fiber.

The "chemical" idea is most generally accepted and is based on the phenomena that the acetylcholine, an active ester of choline, produced by excitation of the autonomous nervous system, will be destroyed by the cholinesterase, breaking up into choline and acetic acid. Cholinesterase exists normally in

the muscle and blood. This destruction may be avoided by administration of physostigmine by reason of the latter's homology to prostigmine. According to Lowery and Dale the nervous impulse sets free a small quantity of acetylcholine which in turn stimulates the muscular fiber. In the normal person, destruction of acetylcholine is quite rapid, but in the myasthenic it is retarded. Stedmann and Russel concluded that the insufficient production of acetylcholine was responsible for the myasthenia. However administration of acetylcholine does not improve the contraction of the muscular fiber.

Bennett and Cash administered endovenous injections of acetylcholine, but the results obtained on patients suffering from myasthenia gravis were not favorable.

It has been claimed that it is not the under production of acetylcholine, but an increase in the destructive action of the cholinesterase which causes the rapid exhaustion. This, however, is not borne out. The muscle which becomes exhausted by voluntary muscular contraction can immediately contract itself upon the application of an electrical, mechanical, or other stimulus. If the exhaustion is the result of electrical excitation, the muscle may be able to contract itself spontaneously.

A. M. Harvey, J. L. Lilienthal and S. A. Talbot published in the Bulletin of the John Hopkins Hospital (December, 1941) the results of their studies on 5 patients. They came to the conclusion that in the myasthenia there must be an alteration in the mechanism which permits the passage of nervous current through the neuro-muscular junction (facilitation and depression).

In connection with the action of curare, I would like to quote from the studies of Bennett and Cash: "The pharmacological action of the curare takes place in the neuromuscular junction or directly upon the muscle; it inhibits, or blocks the acetylcholine and practically obstructs the transmission of the nervous impulse. . . . Curare poisoning produces artificial myasthenia gravis. Possibly with overactivity of the thymus gland there is elaborated a substance which has a curare-like action, similar to that of thyroxin in exophthalmic goiter." These authors use endovenous injections of curare in checking diagnosis of myasthenia gravis.

There is no doubt that the modern conception of Erb-Goldflam's Syndrome is founded on the disorder of the neuro-muscular junction; however, the primary cause of this functional alteration remains in darkness.

Symptomatology: The onset is variable and insidious. There are poorly defined initial symptoms such as diffuse or localized (occipital) headache, congestion of the face, vertiginous reactions and, in the region of the skull nerves, sensitive disturbances which are subjective and vague. Rarely is the beginning as sudden as in one of Strumpell's cases, or that of Jolly's, or in several of Guillian and Alajouanine where they reported "dérobement des jambes". Such patients are often mistaken for epileptics. It is possible that a case reported by Dr. Araujo and myself to the Society of Neurology, Psychiatry and Legal Medicine (session of July, 1943) may have commenced in this manner.

A. T. Liebermann recently related his observation of a 5 year old boy with a "fulminating" beginning. This represents a unique case in medical literature. As a rule there is a feeling of general weariness, a fatigue caused by the slightest effort, most pronounced when climbing stairs. The fatigue is greatest in the afternoon or at night; it may not be felt at all in the morning. It varies hourly, disappearing with rest (Raymond's phase of fatigue). Later, this weariness tends to become permanent, at least for several weeks or months (Raymond's phase of asthenia) and, when the illness becomes more grave, the muscles reach a state of extreme functional impotence (permanent paresisphase). Usually these phases are not exclusive.

Ocular signs (nerves III-IV-VI) are, as a rule, the first to manifest themselves on one or both sides. These signs are diplopia, paralysis of the muscles controlling convergence and vertical images, internal or external strabismus, mystagmus jerks, pupillary inequality, slow pupillary reaction to light and, in rare instances, exhaustion of the pupillary reaction to light. Von Graefe's sign (failure of the lid to move downward promptly with the eyeball), Stellwag's sign (enlargement of the eyelid's), are seldom noted.

The motor region of the facial nerve on both sides is usually affected, although there may be a predominance on one side. In bulbar asthenic paralysis the patient takes on a tired and inanimate aspect due to the flaccidity of the facial muscles or there may be a somnolent aspect in a double ptosis (Aloysio de Castro). Palpebral ptosis and lagophthalmos (incomplete closure of the eyelids), are frequent signs. To make up for the visual handicap resulting from the dropping of the eyelids, the patient tries to contract the frontal muscles or to bend his head backwards. This causes the facial creases to disappear and the physigonomy becomes inexpressive and blank, the face appearing to be "ironed out" (Charles Davison), and the mouth tends to remain slightly open (V°. motor). This is the myasthenic facies.

In the characteristic myasthenic smile, the muscles which raise the upper lip contract and the canines protrude giving the appearance of a snarling dog. Chewing food produces fatigue of the muscles used for mastication and of those in charge of deglutition, causing a reflux of liquids through the nose. Foods require assistance to reach the mouth and the pharynx (X-XI nerves). The voice becomes nasal, bitonal, dragged and unintelligible; if the patient persists in talking, he will be overcome by complete aphonia. The velum of the palate may become completely flaccid.

A respiratory crisis (fatigue of the laryngeal and intercostal muscles and those of the diaphragm and sterno-mastoid) and circulatory crisis is evidenced after prolonged effort; they are manifested by dyspnea, heart reactions and lowering of arterial tension. Intense dyspnea may cause suffocation with cyanosis and asphyxia.

The tongue (XII cranial nerve) presents a typical aspect: 3 longitudinal wrinkles, the largest in the center, the myasthenic tongue (Wilson).

When the myasthenic disorders reach the nape muscle (a frequent symptom) the head can be held in an erect position only with difficulty, or not at all and it falls sideways, forwards or backwards. Rotation is managed with an effort (sterno-mastoid) or may not be possible.

Asthenia reaches the muscles of the limbs, concentrating at the radius. Walking, climbing stairs, etc., are exhausting and the patient must stop to rest, otherwise a fatal collapse may occur.

Asthenia of the trunk muscles becomes evident. Deformations of the vertebral column (lumbar lordosis, kyphoscoliosis) and difficulty or inability to execute various trunk movements mark the progress of the disease.

After a brief rest, the apparent paresis of the muscles disappears to return with renewed muscular effort. Tendinous reflexes are varied, i.e.: vivid, shortened or suppressed. Repeated test for a reflex may bring about its disappearance altogether. There may be paresthesic sensations, pains in the limbs, in the vertebral column, in the neck or sometimes a sensation of burning, but these are of little import. Headache is common.

Objective alterations of sensibility are scarcely perceptible, being quite superficial. One case showed objective alterations of superficial sensibility peculiarly distributed: shortening of the external surface of the limbs and the trunk towards the center line and from the distal to the proximal part, but this might be related to a probable concomitant polyneuropathy.

Sensorial auditory alterations are due to fatigue of the muscle tensor. There may be a temporary modification of visual acuteness with transitory disturbances of the visual field (contraction).

Muscular atrophy is not as unusual as has been stated (Markeloff), especially in the advanced stages of the illness, which may be due to a decrease of motor function. Advanced cases generally suffer from hypotonia. Muscular fasciculation is rare. The sphincters are usually normal.

Motor-vessel alteration is not usually seen in the clinical picture, although this has been observed in some myasthenic cases as well as occasional cutaneous pigmentations. Mental disturbances such as depression, apathy or attempts to commit suicide are seldom noted.

Laboratory tests do not direct any more light on the subject. Urine and blood are practically normal. The amount of calcium, phosphates, glucose, creatinine, lactic acid, etc., in the blood and in the urine lead to contradictory findings. Study of metabolism is not helpful. In spite of Jolles' test not being

pathognomonic, it is valuable in the diagnosis of myasthenia. This test consists of a rapid exhaustion of muscular contraction by the continuous passage of faradic electricity which can be accomplished with galvanic current as long as the contractions are being repeated. Another noteworthy fact is that when the position of the active electrode, which exhausted the muscular contraction, is changed, the contraction will take place again; the same result is obtained by applying another stimulus.

The myasthenic reaction, as well as the other symptoms, may have various alterations which are part of the clinical aspect of the illness.

The "electromyographic reactions" do not provide any important explanations, although some authors assert that a progressive diminution of the amplitude of the nervous vibrations occurs.

X-ray examination is vitally important. Bell found in more than half of his myasthenic cases hypertrophy or tumor of the thymus, both of which will be discovered upon radiographic examination.

Among exceptional clinical cases are the unilateral myasthenia reported by Heernu (on the left side: ocular globe, face, masseter, etc.), and myasthenia with inverted fatigue found by Auerbach (Archiv für Psych., 1902) in which weariness is greater in the morning than in the afternoon (a condition frequently registered in cases of neurasthenia).

Some forms of the disease are associated with hysteria, facial hemiatrophie, thyroid alterations (exophthalmic goitre), Quincke's edema, hypophysitis hypothalamic diabetes, etc., No typical anatomic chart can be compiled. There are authors who consider myasthenia an illness without anatomical lesions, although various lesions of the nervous system, the muscles and endocrinal glands have been reported. The lesions of the nervous system observed consist merely of trivial and inconstant alterations of the nervous cells, the vessels (hemorrhages and capillary thrombosis, hyaline degeneration) and defective congenital formation.

Recently, H. G. Hadley, in the course of a histopathological study of a case of myasthenia, found some novel vascular alterations (hemorrhage, rare thrombosis) on the cerebral trunk. He described nodules similar to little granules which were localized, particularly in the sub-ependyma region of the cerebral trunk. He found nothing of importance in the muscles or in the hypophysis.

Lymphorrhagia resulting from muscular lesions is generally considered the most characteristic symptom of myasthenia. Groups of cells of the lymphocyte type (lymphocytes, mononuclears, plasmocytes and mastocytes) accumulate in the muscle fibers, inside its sheath, in the perimysium, and around the vessels. The muscles are the seat of degenerated lesions (atrophy, fat or glycogenic infiltration, etc.). However, these alterations are not always present.

In several cases a benign thymoma or a simple hypertrophy of the thymus or even its lymphoid infiltration were reported. Sometimes, this organ deteriorates quite rapidly.

The lesions registered in the suprarenal glands (medullar region), hypophysis (adenoma), thyroid, parathyroids, ovaries, testicles, etc., are of an inconstant nature and possibly may only be a coincidence.

Evolution: The usual beginning of the disease is seen in a ptosis of the eyelids and diplopia; later other disorders, such as defects in phonation, mastication, deglutition and fatigue of the neck muscle develop progressively. On the other hand the symptoms may begin in any muscle. Cases have been described with an acute beginning of only a few weeks and others of an extremely slow evolution extending 30 or more years. The symptoms and signs may decrease during pregnancy or become aggravated during the process of delivery or with each menstrual period. Evolution is generally slowly progressive, with intervals of days, weeks or months of accentuated remissions.

Modern treatment has changed the clinical aspect of myasthenia gravis, by reducing functional disorders or causing them to disappear entirely. During the final period myasthenic patients are confined to bed. Death may be sudden, through dyspnea and respiratory asphyxia or through any other intercurrent infirmity.

Remissions are common in myasthenia gravis. Formerly, the prognosis of the myasthenia was always hopeless, but now, with the help of prostigmine, potassium chloride,

vitamins B1 and E, etc., the prognosis is less gloomy.

Diagnosis: Diagnosis is simple when the clinical aspect consists of a syndrome in which are combined a rapid after mid-day muscular weariness, paralytic asthenia predominant in the muscles enervated by the cranial nerves, and a positive Jolles' reaction.

The initial phase of myasthenia may be confused with other nervous diseases beginning with ocular signs, viz: syphilis, lethargic encephalitis, disseminated sclerosis, ophthalmoplegic migraine, medulla diseases; or, with the muscular distrophies when atrophies of the muscles appear; or with Addison's disease; or with neurasthenia and hysteria. However, in the course of development, symptoms peculiar to each of the above mentioned diseases, will appear to dispel any doubts as to diagnosis.

Sometimes it is difficult to make a differential diagnosis between progressive nuclear ophthalmoplegia (chronic superior polioencephalitis) by reason of the diplopia and ptosis of the eyelids lasting for years, and of the Hutchinson's patch with half closed eyelids. However, in the myasthenia patient the symptoms are reversible and disappear with rest.

Bennett and Cash recently proposed a novel method of differential diagnosis through the administration of an endovenous injection of 1/20 to 1/5 of the standard dose of curare, strong enough to produce a generalized paresis in a normal person (5 to 15 mgs.), causing a profound exaggeration of the symptoms in myasthenic patients.

Treatment: The most important element in treatment is the use of prostigmine through injections of 1 milligram (2 cc.), two or more times per day, preferably in association with atropine (Pritchard-Lancet, 1935); in order to avoid an adverse influence on the heart. Grinker prefers prostigmine tabloids, 30 mg., several times a day. The injected prostigmine acts within 30 minutes and lasts 6 to 8 hours.

On the other hand Laruelle, Massion-Verniory and J. Moldaver caution against the use of prostigmine in serious cases of myasthenia. Milhoret believes that in advanced cases it has practically no effect. But K. Wilson is of the opinion that if the drug is given carefully to patients with intense dyspnea there is good result.

Physostigmine (esepine), resembling prostigmine in many respects, has been used with reported success. Miss Edgeworth, herself a sufferer from myasthenia, recommends the use of ephedrine orally in .02 grain tablets 2 or 3 times daily or by injection under the skin. Benzedrine has also been suggested. Potassium chloride in 2 gram doses several times a day has been tried, but it causes diarrhea and urinary disorders. Glycine (glycocoll or amino-acetic acid) in a solution of 25 per cent gelatine, used in doses of from 20 to 30 gms. twice a day, is advocated by some writers. Arsenic, strychnine, glandular extracts, have been used with varied results.

Vitamins B1 and E have proved helpful in our cases. With one woman patient we tried a continuous injection of vitamin B1 after we discovered signs of polyneuropathy. The sick woman could not walk and became exhausted with the slightest movement, even in the morning. She improved after a year and today she is cured.

It is necessary for the patient to have a complete physical and mental rest. Any feeling of weariness calls for immediate rest.

Alimentation must conform to the needs in each case. Sometimes a feeding-tube is necessary, but the diet should always be rich in vitamins B1 and E. Douthwaite, cited by Wilson, recommends oranges with 3 grs. of ephedrine, daily.

Radiotherapy is mentioned for cases of hypertrophy of the thymus

Eldridge Campbell, N. F. Fradkin and B. Lipetz claimed good results upon removing a tumor of the thymus in a case of myasthenia. In reality, the sick woman was using 4 to 6 prostigmin bromide tablets of 15 milligrams, together with ephedrine daily. It is reasonable that a disorder concomitant to myasthenia aggravates its clinical aspect, and of course the patient improved after the tumor removal.

Neurological Clinical Pathological Conference

of the

Cincinnati General Hospital

CHARLES D. ARING, M.D., *Editor*

CASE NO. 41-102

PRESENTATION

In 1937 a 45 year old physician had developed some tingling in the fingers which had occurred intermittently since that time. In late 1939 he had first observed some diminution in his ability to control his legs, especially in the dark. Five or six months later he noted fatigue in the lower extremities, and on one occasion he fell. The thigh muscles were somewhat tender to pressure, and he observed that his legs ached on arising in the morning as though he had exercised them considerably the day before. His gait, which was only mildly affected during the first six months of his final illness, was a bit more uncertain in the afternoon than in the morning. Tingling appeared in the legs up to the knees when he was fatigued, and his knees tended to give way unexpectedly. There was quite definite reduction in strength of the lower extremities, which was most obvious on going down stairs.

The patient was examined in March 1940, and the following abnormalities were recorded. To the usual tests, the only weakness was thought to be flexion of the thighs on the abdomen. There was some difficulty in locating the knee in the heel-knee-shin test, and then mild ataxia. Station was unsteady with the eyes open or closed. He was unable to stand on either foot. The gait was broadly based and somewhat ataxic. The appreciation of vibration was lost below the second lumbar vertebra posteriorly and the lower rib margins anteriorly. The deep reflexes were hyperactive; the knee jerks pendular. The skin reflexes were absent. The plantar responses on the left were extensor, on the right alternately tended to be either flexor or extensor. In early April the plantar responses were bilaterally extensor, and the right upper abdominal reflex was obtained.

Thenceforth he was given liberal doses of liver extract and thiamine intramuscularly, and mixed vitamins by mouth. He discontinued smoking which had been excessive. By late May he was feeling subjectively improved. He felt that he got up and down stairs better and that there was less staggering, which had become most obvious in the morning on arising. There was no aching in the legs as formerly. He noted that his gait was worse with excitement or on being watched. The tingling remained in the hands, and his feet felt hot.

In May 1940 he was practically unchanged. In July 1940 he noted that tingling was present intermittently in the finger and toe tips. He felt that he could descend stairs better. The appreciation of vibration had improved at this examination. It was now perceived everywhere in the lower extremities, but was reduced. Station was still slightly unsteady with the eyes open. He was still unable to stand on either foot.

In September 1940 he again noted occasional aching of the legs. His legs were easily fatigued. He was not smoking. The fingertips were tingling occasionally, and he was sensitive of what he called mild vibration in them. Slight ataxia remained on the heel-knee-shin test. There was swaying in the Romberg position. The appreciation of vibration was now thought to be nearly normal.

On December 26, 1940 at another examination, he noted that the fingers still tingled occasionally, though the feet were suffering less therefrom. His chief difficulty was in walking downstairs. His legs ached when he was on them too much, and they were stiff if he maintained positions for too long a time. He had continued to take vitamins (B complex and E) since first being seen by a physician. The neurological examination was unchanged except for the fact that vibration was thought to be less well appreciated in the lower extremities than on the examination of three months previously.

On December 29, 1940 he slipped and fell

heavily on his back and suffered a fracture of the first lumbar vertebra. The only findings referrable to the injury were pain in the back and inability to urinate, for which he had to be catherterized thereafter. He was placed in a body cast extending from the upper margin of the sternum to the symphysis pubis on January 4, 1941. He did well until January 7, when while being lifted from bed to chair he experienced sudden cough, cyanosis, and collapse associated with tachypnea and tachycardia. He was immediately placed back into bed under an oxygen tent. For several days he had paroxysms of hiccoughing. He developed fever and leukocytosis with the acute episode of January 7. The pulse was irregular and rapid. Chemotherapy was begun. Hemoptysis was first observed on January 8. On January 11 the patient became confused. His temperature remained mildly elevated, and hiccoughing became less frequent, persisting until January 18.

He continued to expectorate bright blood. The patient had periods of restlessness and confusion. He experienced transitory auricular flutter. Despite repeated blood transfusions and other supportive therapy, he expired on January 22, 1941.

Laboratory Data: The temperature, pulse, and respiration were normal until January 7. Thereafter the white count remained elevated, the high being 30,000 per cmm. with a polymorphonuclear content of 90 per cent. A gastric analysis done on March 27 revealed liberal free hydrochloric acid (20 degrees). Blood Kahn and Wassermann tests were negative. Blood counts done early in 1940 were normal; the erythrocyte count remained just above 5 million, the hemoglobin was 17 grams per 100 cc.

Roentgen studies were as follows: On December 29 there was compression fracture of the first lumbar vertebra, which after application of the body cast with hyperextension showed improvement in its alignment. On January 8 an area of consolidation was reported in the right lower lung, probably due to infarction. On January 14 there was some clearing of the lung lesion. On January 19 there was an area of consolidation at the base of the right upper lobe. The trachea was deviated toward the right. On January 21 there was extensive infiltration of the right lung, particularly marked in the upper lobe, where there were numerous cavities.

Catherterized specimens of urine were examined about every third day throughout the hospital stay. They revealed a slight amount of albumin and acetone. A lumbar puncture was performed on April 1, 1940. The pressure was 150 mm. of water; the dynamics were normal. There were 6 white blood cells per cmm. The protein was 75 mg. per cent. The gold curve was 1211111100. The cerebrospinal fluid Wassermann was negative.

Differential Diagnosis

Dr. Milton Rosenbaum: Obviously we are dealing with a disease of the spinal cord, where the brunt is falling on the posterior and lateral columns. I think the differential diagnosis is between multiple sclerosis and subacute combined degeneration of the spinal cord; I do not believe the death was related to the neurological disorder, except as it precipitated the accident. I shall outline the points in favor of each of these diseases.

The course favors multiple sclerosis; remissions and exacerbations during the illness even though they appear related to treatment are observed classically in multiple sclerosis. I think this man had more than posterior and the usual lateral column involvement in the cord; it is a difficult point to prove but there was some suggestion of spinocerebellar tract involvement. The pendular knee reflexes and the station (he swayed in the Romberg position with his eyes opened or closed) are suggestive of cerebellar tract involvement. Also the gait was wide-based even though the appreciation of position was normal.

Another point in favor of disseminated sclerosis was the changing neurological picture. For instance, in the examination in March the abdominal reflexes were not obtained. Two or three weeks later the right abdominal reflex returned, and the plantar responses previously equivocal on the right became definitely extensor. Such changes are characteristic of multiple sclerosis, so characteristic that at times they become a source of contention among House Officers, and between the House and Visiting Staffs. One

might find a Babinski one day and a few days later not obtain it.

In favor of multiple sclerosis is the subjective improvement after treatment was begun. I do not think this improvement is limited to multiple sclerosis (a patient usually feels better after he has seen a physician), but I think it is usually the case. There is a tendency for these people to feel better subjectively no matter what you do. Enthusiasm for and the seeking out of treatment are seen in multiple sclerosis. One must therefore be overcautious in evaluating the results of therapy in this disease.

What are the points in favor of subacute combined degeneration of the spinal cord? This man had paresthesias, numbness, and tingling and vibrating sensations simultaneously in the hands and in the feet. There is no question but that these are classical symptoms of combined system degeneration. It is one of the few diseases that will result in paresthesias simultaneously in the ends of four limbs. This may also be seen in multiple sclerosis, though in a man aged 42 years whose disease begins thusly, one would certainly consider subacute combined degeneration.

A symptom strongly in favor of subacute combined degeneration is the involvement of peripheral nerves. The combination of paresthesias, aching and painful extremities with tenderness on examination certainly points to disease of the peripheral nerves. We know in subacute degeneration there is associated deterioration of peripheral nerves. Whether patients who have multiple sclerosis may also have peripheral neuritis as a part of that disease, I do not know.

I think a third point in favor of combined system degeneration is the lack of spasticity throughout the illness. There was no evidence clinically that the cerebral hemispheres, brain stem or cerebellum were involved; the disease was limited to the spinal cord.

Also in favor of subacute combined degeneration is the objective and subjective improvement that occurred after liver extract and vitamin therapy.

The main objection to the diagnosis of combined system degeneration is the absence of pernicious anemia and the presence of free hydrochloric acid in the gastric secretion. This brings us to the most important aspect of this case—may one have subacute combined degeneration of the spinal cord without pernicious anemia and achlorhydria? There are varying opinions about the matter. Sometimes the first symptom of pernicious anemia is from the spinal cord. If such a patient be followed long enough he will probably develop symptoms other than neurologic. It has been said* the nervous symptoms never develop in a patient already under observation for anemia.

The plausibility of subacute combined degeneration of the cord without pernicious anemia was developed by Suh and Merritt.** They reported eight cases in which there was evidence of posterior and lateral column lesion without change in the blood. In some of these cases there was free hydrochloric acid. This paper influenced us to treat such patients as though they had pernicious anemia. Doctor Merritt has informed us recently that he now feels some of these cases are most likely multiple sclerosis. Seven of their cases were women. I don't know the exact sex incidence of multiple sclerosis, but the great majority of cases that I have seen have been women. Pernicious anemia is equally divided between the sexes.

I think it is almost impossible to differentiate spinal multiple sclerosis without any previous history of eye or tract involvement from subacute combined degeneration, and I believe I am justified in having trouble in this differentiation if a clinician as capable as Doctor Merritt has done so. If one saw a patient like this he should give liver extract, and treat him as though he had combined system disease without clinical evidence of pernicious anemia. I believe, however, that this man had multiple sclerosis, and that what remission there was, was probably spontaneous. Here we have an excellent example of the peril involved in judging the result of treatment in disseminated sclerosis.

The man probably slipped because the long tracts in the cord were not functioning prop-

*Price, F. W.: "A Textbook of the Practice of Medicine," Sixth Edition, *Oxford University Press*, London, 1941, (page 1738), pp. 2032.

**Suh, T. H. and Merritt, H. H.: "Combined System Disease Without Obvious Evidence of Pernicious Anemia," *Amer. J. Med. Sciences*, 1938, 196: 57-66.

erly. He was put in a cast. That was before the days of the liberal use of metrazol and shock therapy, when we did not know how innocuous vertebral fracture may be. Now, when we see fractures of the vertebrae resulting from electric shock therapy we usually do not get too excited. When our patients have pain as did this man we treat them with analgesics, we never put them in casts.

This patient also had urinary retention and the question arises whether this was due to traumatic involvement of roots or whether the symptom was based on neurological disease which had been present for three or four years. In neurology one is often called upon to exercise judgment as to what came first, the trauma or the disease. The fact that urinary retention was so closely related to the fall suggests involvement of the roots by the injury. However, I would be inclined to think that it was a part of the old neurological disorder. The immobility developed by the cast very likely resulted in venous thrombosis (femoral) which was followed by pulmonary infarction due to emboli. Also he may have aspirated fluid and food, which added to the lessened resistance of the lung.

I believe this man had multiple sclerosis. Had I seen him clinically I would have treated the neurological disease just as it was treated.

Discussion of Pathology

Dr. I. Mark Scheinker: In the spinal column the first lumbar vertebra was narrower than its neighbors and was somewhat discolored (reddish). The spinal canal was not distorted, neither was the spinal cord.

On the surface the nervous system was grossly normal. Coronal sections through both hemispheres revealed the presence of a few sharply outlined foci of grayish discoloration of the typical appearance of the plaques of multiple sclerosis. The largest plaques were seen in the vicinity of the lateral ventricles and in the centrum semiovale. On cross section through the spinal cord a few large plaques involving the lateral and dorsal columns were found.

The microscopic examination of sections taken from the brain and spinal cord revealed numerous sharply outlined foci of demyelination and sclerosis. In sections taken from lower cervical region there were two large areas of myelin loss; one extended from the left periphery of the cord through the left lateral pyramidal tract and through the lateral portion of the gray matter and was connected with another which involved the entire area occupied by the dorsal columns. In the demyelinated areas there was heavy proliferation of glia cells and fibers. With the cresyl violet stain it was determined that the nerve cells were preserved. In preparations stained by the Bodian method (silver impregnation) the nerve fibers appeared fairly well preserved and slightly reduced in number.

Some of the smaller plaques showed topographic relationship to congested or thrombosed veins. In some instances the enormously distended and thrombosed veins were surrounded by a narrow zone of demyelinization. No inflammation was seen.

Some of the roots of the spinal cord showed marked loss of myelin and advanced degeneration of nerve fibers, which were reduced in number.

The microscopic examination of sections taken from both femoral veins disclosed subsiding phlebitis with organizing thrombosis. Sections taken from the lungs revealed embolic occlusion of some of the branches of the right pulmonary artery, abscess formation and gangrene of the right upper lobe associated with an acute purulent bronchitis, and extensive bronchopneumonia.

Clinical Diagnosis

Subacute combined degeneration of the spinal cord.

Fracture of the first lumbar vertebra.

Pulmonary infarction and abscess, right, secondary to thrombosis of the femoral veins.

Doctor Rosenbaum's Diagnosis

Disseminated sclerosis.

Fracture of the first lumbar vertebra.

Pulmonary infarction and abscess formation, secondary to thrombosis of the femoral veins.

Anatomical Diagnosis

Disseminated sclerosis.

Traumatic crushing fracture, first lumbar vertebra.

Embolic occlusion of branches of right pulmonary artery.
Pulmonary abscess and gangrene, right upper lobe.
Purulent bronchitis.
Bronchopneumonia.

Dr. Charles D. Aring: This case was selected to illustrate the difficulties in the differential diagnosis so beautifully made by Doctor Rosenbaum. This differential diagnosis has thrown me a number of times, as it has my friend, Doctor Merritt. I don't think the textbooks make enough of this point; at least they don't assuage my chagrin at having on several occasions diagnosed subacute combined degeneration in a patient who later showed obvious signs of disseminated sclerosis.

When one considers the problem physiologically and anatomically, and thinks of the many diseases that may involve the spinal cord, particularly diseases which disseminate, what other signs could one expect from the cord besides those indicating dysfunction of the posterior and lateral columns? The manner in which this organ may react is quite limited. Incidentally we know clinically of no anterior column signs.

To my knowledge the peripheral nerves have not been satisfactorily investigated in disseminated sclerosis. In this case their proximal portions (roots) were obviously diseased; the remainder was not available for study. We have been examining the peripheral nerves in cases dying with disseminated sclerosis and to our considerable surprise have found them to be involved in all of a limited number of cases. If this finding is borne out by further study, the early differential diagnosis between disseminated sclerosis and subacute combined degeneration of the cord is fraught with considerably more hazard than we have been led to expect.

About the point as to whether or not subacute combined degeneration of the cord can exist without pernicious anemia, I must say that I have an open mind. Doctor Rosenbaum covered the situation completely and as far as our present knowledge allows.

Doctor Rosenbaum: Would Doctor McIntyre like to comment on the prognosis of patients who start with spinal cord signs and those who begin with eye involvement?

Dr. Howard D. McIntyre: The spinal cord group is an older age group and the prognosis is not as good. They do not maintain a life of utility as long as the patients who have retrobulbar neuritis at the age of 20, and ten years later numbness, and five years later something else; here the prognosis is better. In the spinal cord group the course is usually progressively downward, though the man discussed today might have lived a number of years. I think that this type of case beginning at 40 or 50 years years of age (52 is the latest in my experience) has a poor prognosis.

Dr. Harry M. Salzer: A clinical point that should have made us consider disseminated sclerosis was the improvement in vibration. Less than ten per cent of patients with the cord change associated with pernicious anemia will ever show any improvement in vibration.

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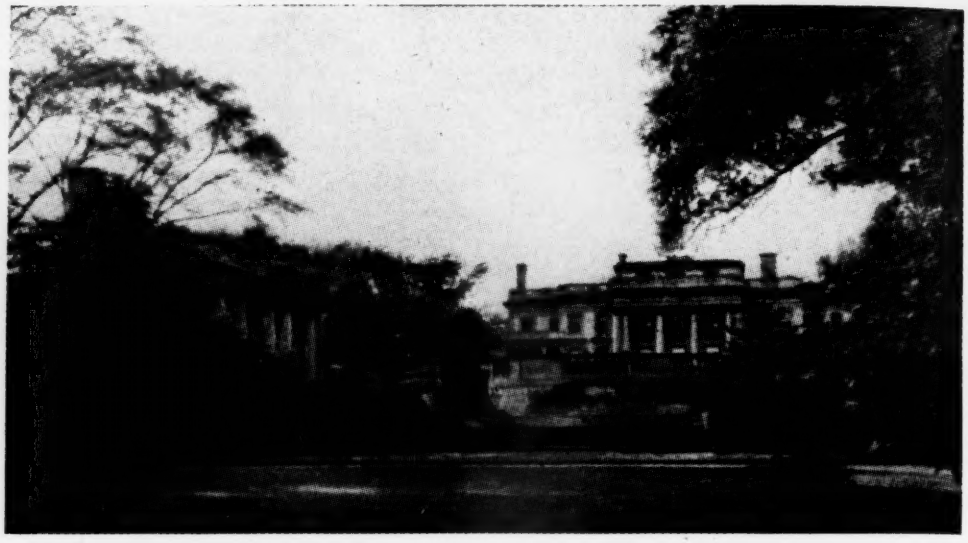

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